US Army Corps of Engineers®
Engineer Research and Development Center

# Environmental Chemistry Laboratory (ECL)

## Purpose

The Environmental Chemistry Laboratory (ECL) at the Construction Engineering Research Laboratory (CERL) offers current scientific equipment and expertise to meet analytical needs not commonly available at commercial laboratories. The ECL is equipped to provide a one-stop service to meet these specialized requirements quickly and affordably.

## Specifications

Analytical support requires a variety of instrumentation, depending on the sample medium (solid, liquid, or gas), the composition (organic or inorganic), and the concentration (required detection limit). Analysis can be non-specific when measuring groups of similar compounds (e.g., total organic carbon, or oil and grease), or specific for the measurement of individual compounds. The following analytical instrumentation is currently available and in use at the ECL:

1. Tools for Organic Analysis:
   - Gas Chromatograph/Mass Spectrometer (GC/MS)
   - Liquid Chromatograph/Mass Spectrometer (LC/MS)
   - High-Pressure Liquid Chromatograph with Ultraviolet/Visible (UV/Vis) light and Photodiode Array (PDA) Detectors
   - Fourier Transform Infrared (FTIR) Spectrometer
   - Liquid Chromatograph/Infrared (LC/IR)
   - Pyrolysis Gas Chromatograph/Mass Spectrometer (GC/MS)
   - UV/Vis Absorbance Spectrophotometer
2. Tools for Inorganic Analysis:
   - Flame & Graphite Furnace Atomic Absorption (AA) Spectrometer
   - Ion Chromatograph (IC)
   - Electrochemical Analysis
   - Auto-Titrator
   - ATM Sonic Sifter
3. Tools for Field Analysis: A fully equipped mobile laboratory including soil, water, and air sampling equipment.

## Benefits

ECL customers receive timely analysis of crucial samples and exploratory analysis of materials of unknown composition. The ECL fills a unique research "niche" for the Army community; it is the sole analytical support base for some U.S. Army projects, and a cost-saving resource for situations where testing under contract to an outside laboratory would be prohibitively expensive due to the complexity of analysis. Where the ECL does not have the equipment, expertise, or time to analyze samples, the laboratory has developed a working relationship with the nearby University of Illinois Waste Management and Research Center.

**Success Stories**

CERL researchers and Army customers have used the ECL facility to:

- analyze wastewater runoff from aircraft washing facilities
- identify by-products from advanced oxidation processes
- analyze oil/grease from oil/water separator discharges
- monitor erosion on training ranges by Total Suspended Solids (TSS) in river samples
- analyze industrial wastewaters
- determine heavy metal leaching from zebra mussels anti-foulant coatings
- analyze paint blast media residue for Toxicity Characteristic Leaching Procedure (TCLP) parameters
- assess onsite environmental energetic contamination of soil and water
- collect and analyze hazardous waste incinerator emissions
- monitor sonolytic and photocatalytic water remediation techniques
- evaluate heavy metal stabilization products
- characterize novel carbon fiber filters.

**ERDC POCs**

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